

IN THE CLAIMS:

1 1. (Currently Amended) A shutter mechanism for controlling reactants in a direct oxida-
2 tion fuel cell system, having at least one fuel cell including a membrane electrode assem-
3 bly, comprising:

4 a moving component disposed within the fuel cell between a source of a reactant
5 and the membrane electrode assembly, said moving component having a plurality of lat-
6 erally displaced protrusions, wherein said ~~movable~~ moving component is adjustable in a
7 direction perpendicular to the plane in which the component is disposed, such that when
8 it is adjusted, the component travels generally in a z-axis within a vapor gap, closer to or
9 further away from an anode current collector, to control fuel flow while not consuming
10 substantially additional volume within the fuel cell and to allow for the fuel cell to have a
11 smaller size for use with a mobile phone, laptop, or handheld computer; and

12 the anode current collector formed with a plurality of laterally displaced openings
13 corresponding to the plurality of laterally displaced protrusions, such that when said mov-
14 ing component is placed adjacent to ~~said receiving element~~ the anode current collector,
15 the flow of said reactant is controlled, wherein said ~~moving~~ movable component is con-
16 figured such that when said ~~moving~~ movable component is adjusted to a closed position,
17 said protrusions interconnect with the openings in the anode current collector to substan-
18 tially seal said openings, and said ~~moving~~ movable component also having apertures
19 therein interspersed with said protrusions in such a manner that when said ~~movable~~ mov-
20 ing component ~~plate~~ is in an open position, said apertures allow for flow of fuel there-
21 through to the membrane electrode assembly.

1 2. (Cancelled)

1 3. (Currently Amended) The shutter mechanism as defined in claim 1 wherein said mov-
2 ing component is placed between a fuel source and an anode aspect of said fuel cell, and
3 ~~said receiving element is an anode current collector and~~ when said moving component is
4 placed adjacent to said anode current collector, fuel flow to said anode aspect is re-
5 stricted.

1 4. (Currently Amended) A shutter mechanism for a direct oxidation fuel cell system,
2 comprising:

3 (A) a fuel source;

4 (B) a direct oxidation fuel cell, including:

5 (i) a protonically conductive membrane having catalyst coatings on
6 each of its major surfaces, being an anode aspect and a cathode as-
7 pect;

8 (ii) an anode current collector disposed generally at said anode aspect;

9 (iii) a cathode current collector disposed generally at said cathode as-
10 pect;

11 (iv) a passive mass transport barrier disposed generally between said
12 fuel source and said anode aspect and spaced from said anode as-
13 pect to define a vapor gap in said fuel cell, said passive mass trans-
14 port barrier controlling a rate of fuel delivery to said catalyzed an-
15 ode aspect of said fuel cell;

16 (v) a movable shutter plate having a plurality of laterally displaced
17 protrusions disposed within said vapor gap between said passive
18 mass transport barrier and said anode current collector which
19 forms a plurality of laterally displaced openings corresponding to
20 the plurality of laterally displaced protrusions such that said mov-
21 able shutter plate is adjustable to substantially or partially prevent

fuel flow through said anode current collector to the anode aspect of said fuel cell, wherein said movable plate is configured such that when said movable plate is adjusted to a closed position, said protrusions interconnect with the openings in the anode current collector to substantially seal said openings, and said movable plate also having apertures therein interspersed with said protrusions in such a manner that when said movable plate is in an open position, said apertures allow for flow of fuel therethrough, and said movable plate is adjustable in a direction perpendicular to the plane in which the plate is disposed, such that when it is adjusted, the plate travels generally in a z-axis within said vapor gap, closer to or further away from said anode current collector, to control fuel flow while not consuming substantially additional volume within said fuel cell and to allow for the fuel cell to have a smaller size for use with a mobile phone, laptop, or handheld computer; and

(vi) a load coupled between said anode current collector and said cathode current collector for utilizing the electricity generated by the fuel cell.

5. (Cancelled)

6. (Previously Presented) The shutter mechanism as defined in claim 4 further comprising:

said protrusions have angled sides; and

said openings in said anode current collector being correspondingly angled such that said protrusions interconnect securely within said angled openings of said current collector to substantially seal said openings against fuel flow.

1 7. (Previously Presented) The shutter mechanism as defined in claim 4 wherein said pro-
2 trusions are substantially comprised of a compliant material that is compressed into said
3 openings when said movable plate is adjusted to a closed position.

1 8. (Previously Presented) The shutter mechanism as defined in claim 4 further comprising
2 a coating disposed on the sides of said protrusions in said movable plate which further
3 secures sealing of said anode current collector against fuel flow therethrough.

1 9-26. (Cancelled)